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Dear Sir:

A grant of $1 million has now been made to the University of Michigan for construction on the Ann Arbor campus of a nuclear reactor for research purposes. The grant, made by the Ford Motor Company Fund, enabled the University's Phoenix project to exceed its fund raising goal of $6.5 million by some $800,000. The Phoenix project will explore the constructive uses of nuclear energy. Michigan's reactor will be the second in the United States outside of Federal reservations; the first such private nuclear reactor is now approaching completion at the University of North Carolina, Raleigh.

Exploding last fortnight some 2,500-feet over the southermost portion of the Las Vegas proving ground, the eighth nuclear detonation of the current series appeared to be the most violent of those detonated this year. The detonation tested bunkers, and simulated fortifications, both above and underground; a series of wall segments and textile samples were mounted for civilian defense experiments. In connection with the detonation, 2,000 Army troops moved forward in maneuvers an hour after the blast. Aircraft of the Air Force included the usual planes for radiation tracking and scientific measurements.

In a new bill introduced into the House of Representatives, development of nuclear power by private means is being encouraged. The bill would forbid the Government to sell nuclear generated power, except in connection with production of atomic weapons and materials. Another proviso would enable patents to be granted on privately financed, nonweapons, nuclear developments.

A problem facing scientists and engineers who are attempting to develop economic nuclear energy is to bring the cost of a power producing nuclear reactor down to $200 per kilowatt-hour of capacity, or less, Dr. Karl Cohen told a dinner meeting of the American Society of Tool Engineers last week in New York. Dr. Cohen is vice-president of Walter Kidde Nuclear Laboratories. He emphasized that one cannot take the cost of a nuclear reactor, built on a military schedule for a specific military purpose, and derive from this a "dollars-over-kilowatts figure" for a commercial power plant. It is inventive design, he said, which can enable reactor costs to be brought down to the economically competitive point.

Executive staff of the Atomic Industrial Forum, Inc., was appointed last week at the meeting of the board of directors in New York of the Forum. Walker Cisler, president of Detroit Edison, was made president of the Forum; Alfred Iddles, president, Babcock & Wilcox, was elected vice-president; and Dr. F. L. Hovde, president of Purdue University, was also made a vice-president. F. K. McCune, general manager, atomic products division, General Electric, and P. Y. Yates, senior vice-president, Bechtel Corp., were made directors. (Objectives of the Forum are to foster and encourage development and utilization of nuclear energy; advise industry on its nuclear energy problems; and encourage nuclear research.)

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NEW PRODUCTS, PROCESSES, & SERVICES...in the nuclear field...

FROM THE MANUFACTURERS-An improved line of cosmic ray counters, now offered by this manufacturer, incorporate improvements, in production of its counters of this type, which are said to embrace: (1) increased area of evacuation tabulation, resulting in better control of evacuation techniques, (2) sturdier construction at the evacuation point, achieved by moving the evacuation tabulation from the trip of the Stupakoff to the end plug assuring the user longer life, and (3) new construction allowing more intense heating during evacuation which results in better outgassing of counter walls assuring longer useful life.--Radiation Counter Laboratories, Inc., Skokie, Ill.

A new scintillation agent for liquid scintillation counters: 2,5-diphenyloxazole, is now being produced. Present pilot - plant production makes the chemical available in 50-lb. lots. Uses include cosmic ray studies and for determination of radioactive emanations.--Arapahoe Chemicals, Inc., Boulder, Colo.

NEW SERVICES- An organization known as Nuclear Engineering Co., Inc., Joseph E. Law, Jr., president, which has been established in San Francisco, offers guidance and assistance in the fields of radioisotope applications and other industrial applications of nuclear energy. The firm states that it is prepared to: Provide for disposal of radioactive wastes (USAEC-authorized); formulate and supply special facilities for handling and working with radioactive materials; provide adequate protective clothing to protect against radioactive contamination; provide a dosimetry service for people working with radioactive materials; formulate radiation detection and measurement equipment requirements; and to perform other necessary health physics services for laboratories using radioactive materials. Additionally, the firm also offers advice and consultation to industry generally so that the potentialities of nuclear energy may be understood.

BUSINESS NEWS...in the nuclear energy field...

ADDITIONAL FIRMS JOIN IN NUCLEAR REACTOR POWER STUDY- Twelve additional companies have now been approved by the USAEC as associates with Dow Chemical Co., and the Detroit Edison Co., in a joint study with the USAEC of the possibility of developing a nuclear reactor to produce power. While the Dow-Detroit Companies will continue to be the primary participants with the USAEC, people from the additional companies will be utilized in the study, as needs arise. These twelve additional companies are: Consolidated Gas Electric Light and Power Co., of Baltimore; Hartford Electric Light Co.; Niagara Mohawk Power Corp; Potomac Elec. Power Co.; Rochester Gas & Elec. Corp.; The Southern Co.; Allis-Chalmers Mfg. Co.; Bendix Aviation Corp.; Ford Motor Co.; United Engineers & Constructors, Inc.; Atlantic City Elec. Co.; and Gibbs & Cox, Inc,

These additions bring the total number of companies associated with the Dow-Detroit project to twenty-five. Nuclear Development Associates, Inc., and the Babcock & Wilcox Co., have been affiliated with the project since its inception in May, 1951. In October, 1952, eleven other companies affiliated with the study. These were: Cincinnatic Gas & Electric Co.; Cleveland Elec. Illuminating Co.; Consolidated Edison Co., New York; Consumers Power Co.; General Public Utilities Corp.; New England Elec. System; Philadelphia Electric Co.; Public Service Electric & Gas Co., New Jersey; Toledo Edison Co.; Vitro Corp. of America; and the Wisconsin Electric Power Co.

(The Dow-Detroit group was one of the four brought into the U.S. atomic energy program in 1951 to study the practicability of private investment in the nuclear power field. The three other original study groups are: (1) Commonwealth Edison Co., and Public Service Co. of Norther Illinois, Chicago. (2) Monsanto Chemical Co., St. Louis, and its associate, The Union Electric Co., of Missouri, St. Louis. (3) The Pacific Gas and Electric Co., and the Bechtel Corp., San Francisco. A fifth group, consisting of Foster Wheeler Corp., and the Pioneer Service and Engineering Co., has recently been authorized and has initiated activities.)

Much of the work by Dow Chemical and Detroit Edison will be carried on in their own facilities; expenditures by the firms for 1953 are estimated at $1 million. When research requires the special facilities of the USAEC's National Laboratories, the work will be under the direction of USAEC people. The associated companies will provide security-cleared people who are qualified for the work.

NUCLEAR WORK OUTSIDE THE UNITED STATES...news & notes...

CANADA- Experts in radiobiology and in the control of radiation hazards from Canada and the United States met last week with members of the USAEC's advisory committee on biology and medicine at the Chalk River project of Atomic Energy of Canada, Ltd., Ontario. (This USAEC advisory committee, which meets from time to time in various parts of the U. S., reviews the USAEC medical and biological research programs and health hazard controls, and recommends general policies in these fields.)

In this latest meeting at Chalk River, discussions included: permissible doses of radiation for military and civil defense workers, instruments used in radiation defense, health measures in uranium mines, the latest decontamination agents for human use, health and safety measures taken at a U. S. atomic energy project, and data on the fallout of radioactivity following atomic explosions in the U.S.

In addition, one of the members of the USAEC's advisory committee, Dr. Curt Stern, professor of zoology at the University of Calif., held a seminar at the project on the genetic effects of radiation.

NORWAY- Norwegian production of radioisotopes is increasing steadily, according to Professor Bjorn Trumpy, chairman of the Norwegian Reactor Commission. He said that not only has much been sold in Norway, but that deliveries are being made outside Norway as well. The isotopes are produced at the uranium reactor at Kjeller, north of Oslo, where the reactor and laboratories are run jointly by a Norwegian-Dutch Commission. Among the materials made radioactive at Kjeller are cobalt, iodine, sulfur, iridium, and phosphorous.

GREAT BRITAIN- A review of nuclear energy work in Britain was given the House of Commons in London in the last fortnight by Duncan Sandys, Minister of Supply. Mr. Sandys, whose Ministry oversees Britain's nuclear work, said that altogether there are now seven nuclear establishments in that country: Harwell, Aldermaston, Amersham, Capenhurst, Risley, Springfields, and Windscale.

At Aldermaston, and its outstation at Woolwich, research work on nuclear weapons is carried out, Mr. Sandys stated. Harwell, he said, conducts fundamental research into nuclear physics, and nuclear energy, and provides basic scientific information to the other establishments. Amersham he said is a radio-chemical center; Risley, the design and planning office for producing fissile material; Springfields, the center for producing pure uranium from uranium concentrates; Windscale, the center for producing plutonium from uranium by nuclear reactors; while Capenhurst produces a fissile material that can be used as an alternative to plutonium.

NEW BOOKS & OTHER PUBLICATIONS...in the nuclear energy field...

Radiations & Living Cells, by F. G. Spear, deputy director, Strangeways Research Laboratory, Cambridge (Eng.). Treats the subject at an intermediate level. Describes the action of penetrating radiations on the living cell, with special reference to the effect on cell division. Nuclear energy as a source of radiation, medical uses of penetrating rays, and theoretical questions are among the other topics covered. The author first provides an historical and physiological background, and follows with a general discussion of the problems involved. 222 pages.--John Wiley & Sons, Inc., New York 16, N. Y. ($3.50)

Total Atomic Defense, by S. G. Kimball. Embodies suggestions for defending cities against atomic attack. 224 pages.--Richard R. Smith, Publisher, West Rindge, N.H. ($3.00)

NOTE: The following four declassified USAEC documents are now obtainable from Office of Technical Services, Washington 25, D.C., at prices stated:

(1) Low cost experimental neutron chain reactor. Work done at Oak Ridge National Laboratory. (45¢)

(2) Radiobiological survey of Bikini, Eniwetok, and Likiep atolls. Work done by Applied Fisheries Lab., University of Washington, July-Aug. 1949. Published in 1950. (90¢)

(3) Reactor theory terms. Published at Oak Ridge National Lab., July, 1952. (80¢)

(4) Dose rates of radiation from thorium and from enriched uranium. From Oak Ridge National Laboratory. Site issuance date: April 9, 1951. (20¢)

A POWER ENGINEER LOOKS AT NUCLEAR ENERGY FOR ELECTRIC UTILITIES.
A condensation of a paper by Theodore Baumeister, professor of mechanical engineering, Columbia Univ., and electric utility consultant, delivered before N.Y. Soc. of Security Analysts, May 1st, 1953.

To me, as a practical person, the first and most important inducement to the successful harnessing of nuclear energy is the magnitude of the potential.

We hear of oil and its imminent depletion. We hear that natural gas could supply all our energy needs for five years and then there would be no more. The coal picture is better--there are proven supplies in the ground for hundreds, if not thousands of years.

Now, in comparison, where does fissionable fuel stand? Uranium and thorium are our two present sources of fission fuel.

By means of breeding, the proven reserves of fissionable fuel (as uranium) can be so extended that they constitute an energy potential about 25 times as great as all the known reserves of all the fossil fuels, i.e., coal, plus petroleum, plus natural gas. The magnitude of these reserves--twenty-five times the figure for conventional fuels--means to me that the human race is going to harness that energy source, successfully and economically. But it will not be done tomorrow.

The present situation, however, shows three clearly recognizable and tremendous problems which must be solved before a practical nuclear power plant becomes available. The first problems is essentially technical; the second is economic; and the third is legal.

Assuming the technical problems are hurdled, the second big problem is to take a technically sound job and make it economically effective. The most rational spot for the nuclear plant seems to be one where we could expect heavy investment to be spread through a large product output. To get low unit costs, the most rational approach is toward large size units--units which would be usable only by the largest utility systems. The competition for the nuclear power plant is here very severe and is set by the steam power plant. I find about $300 per KW is the total allowable and justifiable investment for a nuclear steam-electric power plant. This $300 is about double the price of conventional fossil fuel plant and it must cover (1) capitalized cost of fuel; (2) the entire nuclear reactor and its appurtenances; (3) the usual turbine and electric generating equipment; and (4) all other charges for labor, maintenance, and supplies.

This money is completely inadequate, at present day prices, to justify the construction of a nuclear power plant, if we have to buy prepared fissionable fuel like uranium-235. If, on the other hand, we can make a synthetic fuel like plutonium-239, and utilize the waste heat developed in the process of manufacturing the plutonium to produce steam, then because someone else (usually the U. S. Government) buys the plutonium, it is possible to postulate an economically feasible nuclear power plant. The operation, naturally, depends for its success on the continued market for plutonium. The breeder reactor is a possibility which is very attractive: it uses as fuel the basic uranium-238 which even at prices like $35/lb. will develop the heat equivalent of 1300 tons of coal. With such an arrangement, the price of fuel, in itself, practically vanishes from the calculations.

I look to fields where they can stand high prices for fuel to teach us many valuable lessons. Aviation gasoline, on a heat basis, costs 5 to 10 times as much as coal for most eastern utilities. That means that an aviation type of nuclear reactor power plant has a real head start, economically, over the utility application. While shielding is thick, bulky, and heavy (for such an aircraft), modern conventional planes can easily burn 2 to 3 tons of gasoline an hour. Thus, much dead weight shielding could be substituted for consumable gasoline, and the plane could still get off the ground.

In the naval field there is a similar picture--only more so. The weight limitation is nothing like that on an airplane. Fuel consumption can readily impair the military effectiveness of a submarine or aircraft carrier by limiting its cruising radius. Too, fuel price is secondary to military effectiveness. Thus, the potential for the development of a successful nuclear power plant for use aboard ship is really very great.

ATOMIC PATENT DIGEST...latest grants & licensing notes...

LICENSES AVAILABLE- An additional group of twenty U.S. Government-owned patents, developed in the course of U.S. Government-sponsored nuclear research, has now been made available for licensing to interested firms. Inquiries, concerning this group, and those previously made so available, should be directed to Patent Branch, USAEC, Washington 25, D.C. This new group comprises:

(1) Device and method for separating particles of different masses such as isotopes. U. S. Pat. No. 2,633,539. (Inventor: W. Altar.)

(2) Efficient and reliable method for testing a jacketed body for airtightness, particularly the seam weld. U. S. Pat. No. 2,633,740. (Inventor: J.P. Howe, et al.)

(3) Improved high frequency shunt to effectively isolate a meter. U. S. Pat. No. 2,634,307. (Inventor: Q.A. Kerns.)

(4) Improved electrometer and an improved charging switch adaptable for use with a pocket radiation measuring device. U. S. Pat. No. 2,634,374. (Inventor: F.R. Shonka.)

(5) Preparing uranium tetrabromide by reacting uranium nitride with bromine at a temperature of about 450 deg. C., or above. U. S. Pat. No. 2,635,035. (Inventor: J.E. Powell.)

(6) Method for production of zirconium tetrafluoride which may be successfully used to prepare zirconium metal. U. S. Pat. No. 2,635,037. (Inventor: M.A. Wilhelm, et al.)

(7) Method and apparatus for stereoscopic recomposing and measuring. U. S. Pat. No. 2,635,339. (Inventor: W.M. Powell and H.P. Hernandez, Jr.)

(8) Production of granular beryllium fluoride from beryllium hydroxide. U. S. Pat. No. 2,635,944. (Inventor: K.A. Walsh, et al.)

(9) Process for converting massive metallic thorium to powder metal. U. S. Pat. No. 2,635,956. (Inventor: H.A. Wilhelm, et al.)

(10) Process useful in the separation of rare earth elements from each other, by anion exchange. U. S. Pat. No. 2,636,044. (Inventor: E.H. Huffman, et al.)

(11) Device for measuring the coincidences of electrical pulses. U. S. Pat. No. 2,636,118. (Inventor: B. Smaller.

(12) Uranium complexes of heterocyclic diketones. U. S. Pat. No. 2,636,886. (Inventor: H.I. Schlesinger et al.)

(13) New and improved ion source unit employing a magnetic field to influence the electron discharge therein. U. S. Pat. No. 2,636,990.

(14) Improved electronic counter capable of high speed counting and having double coincidence circuits for identifying particular pulses. U. S. Pat. No. 2,636,993. (Inventor: M.J. Jakobson.)

(15) Improved apparatus for attaching a filament to an electrode, useful in the hot-wire method of preparing metals. U. S. Pat. No. 2,637,297. (Inventor: Z.M. Shapiro.)

(16) Improved means for attaching a hot-wire filament to an electrode, and comprising a reusable adaptor unit. U. S. Pat. No. 2,637,298. (Inventor: Z.M. Shapiro.)

(17) Dispersing materials in a liquid by introducing into the liquid a mixture of solid carbon dioxide and the material to be dispersed. U. S. Pat. No. 2,637,882. (Inventor: J. De Ment.)

(18) New and improved design for a die casting machine of the evacuable type. U. S. Pat. No. 2,637,882. (Inventor: R.F. Plott.)

(19) Production of uranium tetrafluoride from uranium hexafluoride. U. S. Pat. No. 2,638,406. (Inventor: A.D. Tevebaugh and F. Vaslov.)

(20) Improved construction of an alpha particle counting chamber of the evacuable type. U. S. Pat. No. 2,638,560. (Inventor: C.J. Borkowski.)

Sincerely,

The Staff,
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